

# STATUS OF BEPC2002 OPERATION

Y. Chen, X. Wang, IHEP, P.O. Box 918, Beijing 100039, China

## Abstract

Supported by the leaders of IHEP and accelerator center, BEPC operation made a great achievement in 2002. The total operation time was 4908 hours, in which 1729.2 hours were for high-energy physics experiments, 1425.2 hours for the synchrotron radiation application, 511.5 hours for the injection, 164.6 hours for the

breakdown, 388.2 hours for hardware maintenance and regulation, and 655.3 hours for the machine studies, respectively. Compared with last year, the total operation time exceeded the operation plan by 348 hours on account of the high operation efficiency. Table 1 and Fig. 1 show the statistics of the BEPC running in 2002.

Table 1 Statistics of BEPC performance in 2002

	BES	BSRF	MD	Injection	Recovery	Breakdown	Other
Total (hour)	1729.4	1425.2	655.3	511.5	388.2	164.6	33.8
Percentage (%)	35.24	29.04	13.35	10.42	7.91	3.35	0.69

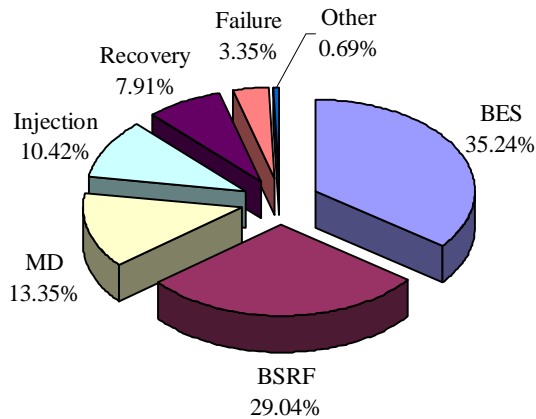


Fig. 1 Statistics of BEPC performance in 2002

## 1. Operation for High Energy Physics

Operation for the high energy physics accounted for the 35.24%, while BES operating at the resonance peak of  $\psi(2s)$ ,  $\psi(3770)$ , the maximum current achieved 90mA. Due to the effort of operation group, many record such as peak luminary were broken. 14.63 million hadron case were collected compared with the plan which was 14 million. Meanwhile 350 hours was offered to the 10<sup>th</sup> experiment hall for the BESIII design.

The 2001/2002 operation of BEPC finished on Jun.15, 2002. When supplied beam to BES at the energies of  $\psi(2S)$  and  $\psi(3770)$ , BEPC operated stably and the collision beam current increased gradually, the maximum beam current was about 90 mA. By the hard work of operation people, some operation records, such as the peak current and luminosity and the hadron events per shift, per day and per week were frequently renewed. For example, on the night shift of Mar. 12, 2002, the maximum luminosity reach  $1.258 \times 10^{31} \text{ cm}^{-2} \text{ s}^{-1}$ , which is

the new record of luminosity at  $\psi(2S)$  energy. Till Mar. 13, 2002, BES totally gained 14.62 M hadron events, more than the scheduled task, which is 14 M  $\psi(2S)$  events. From Apr. 23 to May 19, BES totally gained 0.2858 M  $\psi(3770)$  events, the integrated luminosity was  $8.15 \text{ pb}^{-1}$ , more than the scheduled task 6~8  $\text{pb}^{-1}$ .

## 2. Operation for Synchrotron Radiation

Accounting for 29.04%, 1425.2 hours were offered to synchrotron radiation, which was the most operation time up to now, in synchrotron mode, the maximum current achieved 120-130mA with 20-30 hours lifetime. 293 BSRF experiment tasks were completed. On the whole, beam quality and operation efficiency were satisfied.

The 2002/2003 operation of the storage ring started on Nov. 8, 2002. After two week commissioning of the machine, the BEPC began to provide beam to SR by operating in a dedicated mode. During commissioning time, the beam injected favourably, but the beam lifetime was very short, for the worst vacuum in the storage ring was only  $3 \times 10^{-8}$  Torr. Gradually, the beam lifetime increased, as the vacuum became better. Two new wiggler magnets, 1W1 and 4W2, worked normally, but more imperceptibly adjusting on beam line and more studies on the GAP of 4W2 were needed. The 4W1A beam line was greatly difficult to operation, try it's best, the position and angle of beam at 4W1 were adjusted, but no directed light can be observed, the beam line had to be abandoned provisionally at last.

## 3. Machine Studies

Total machine studies time was 655.3 hours in last periods, in order to ensure the operation of BES and synchrotron, less time was used to study the machine.

As for the storage ring, the machine studies focused on the following question, PEI experiment, BBA, RF system

three cavity tuning and BEPC coupling measurement and so on.

As BEPC's injector, machine studies were also important for Linear accelerator, many results were achieved on the energy gain research, positron beam, energy spread, buncher and pre-buncher adjustment which was essential to keep greater beam and injection rate, the injection rate was more than 3 mA/min on the average.

In 2002, the machine study was focused on the following fields: 1) Studies on the photoelectron effect; 2) Studies on the beam-based alignment system; 3) Studies on the beam lifetime reduction in the dedicated SR operation, i.e., observing the electron beam lifetime when the distributed ion pumps were switched off; 4) Studies on the dedicated SR mode; 5) Studies on the GAP of 4W2 wiggler magnet; 6) Studies on the top off injection; 7) Measurement of the coupling in BEPC, etc.